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Concentration of Physician Services Across Insurers and Effects on Quality

Early Evidence From Medicare Advantage

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Background: A growing proportion of Medicare beneficiaries is covered by private insurers through Medicare Advantage, yet little is known about how these plans are structured in terms of relationships with physicians and implications for quality of care.

Objective: The objective of this study was to assess whether greater physician concentration of services across insurers was associated with higher quality in Medicare Advantage (MA), overall and particularly among MA insurers serving a high proportion of vulnerable enrollees.

Research Design: A retrospective cohort design with regression analysis.

Data Sources: The primary dataset was 2014 MA encounter records submitted by insurers to the Centers for Medicare and Medicaid Services, covering 600,329 physicians across 119 insurers. These data were merged with Centers for Medicare and Medicaid Services data on MA contract quality rating as well as physician characteristics in the Medicare Data on Provider Practice and Specialty file.

Measures: Two measures were generated to capture the concentration of physician services across insurers: the percentage of a physician's Medicare services which was through MA (MA penetration); and the

percentage of a physician's MA services with a specific insurer (insurer share of MA services).

Results: Greater MA penetration and insurer share of MA services were each associated with higher MA plan quality. The relationship between insurer share and quality was stronger in contracts with a relatively high percentage of disabled enrollees.

Conclusion: Greater physician concentration of services across MA insurers was associated with a higher quality of care overall and especially among vulnerable enrollees.

Key Words: Medicare, quality, insurance, physicians, health care organization

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The percentage of Medicare enrollees covered by private insurers through Medicare Advantage (MA) has grown from 17% in 2000 to 33% in 2017.¹ Over this period, research has shown that MA plans tend to provide lower-cost care compared with traditional Medicare (TM), due to both lower utilization and lower prices.^{2,3} Further, there are spillovers to TM; in areas with higher MA penetration, TM spending is lower.^{4,5} Because of a lack of enrollee-level data, there is relatively little work comparing outcomes in MA and TM, however, 1 study shows that MA enrollees receive less intense care and have better outcomes than TM enrollees in 3 postacute care settings.⁶ Evidence of lower costs and better outcomes raises an important question: What strategies are MA plans employing to provide lower cost, higher quality care? One strategy available to insurers is integration with physicians.

At the extreme, insurers and physicians may be jointly owned, for example, a hospital might offer its own health insurance plan. Existing evidence shows that this type of integration was associated with higher quality as well as higher premiums.^{7,8} There may, however, also be less formal relationships between insurers and physicians that could be considered a form of integration. For instance, if a physician provides 50% of her MA services through 1 insurer this may not reflect formal ownership but the physician may still have a closer relationship with that insurer than if she had only 10% of her MA services with that insurer. Like more formal vertical integration, a greater concentration of physician services with a given insurer may facilitate improvements in

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quality (eg, because insurers are more likely to invest in quality initiatives or due to enhanced care coordination),⁹ yet there is little evidence on the extent of these relationships and implications for outcomes.

In this study, we explored whether higher levels of physician service concentration with a particular insurer are associated with differences in quality. Using newly-available data on MA encounters (analogous to claims), we measured the percentage of a physician's services provided to MA versus TM enrollees and, within MA, to enrollees of a given insurer and assessed the relationship between this "service concentration" and MA quality. Further, we evaluated whether the association between service concentration and quality is different among plans that serve a high proportion of at-risk enrollees. At-risk enrollees may especially benefit from concentrated insurer-physician relationships if these relationships facilitate management and coordination of care. If so, this type of integration may be 1 mechanism by which the performance gap between MA plans with high-share and low-share of socially at-risk and medically at-risk enrollees can be narrowed.

A deeper understanding of how MA insurers are improving quality, particularly for vulnerable enrollees, will be important for physicians who already contract with and are considering contracting with MA, and for policymakers given the rising percentage of Medicare beneficiaries receiving coverage through MA.

METHODS

Study Period, Population, and Data

We used newly-available data on MA "encounters" submitted by insurers to the Centers for Medicare and Medicaid Services (CMS) to study 334 MA contracts in 2014. Like TM claims data, encounter data contain enrollee identifier, diagnostic codes, and the national provider identifier (NPI) of the billing physician. The building block of both claims and encounter data are "line items" which account for each service a patient receives (henceforth services). Each service is associated with a service code, date of service, and NPI of the rendering physician. Multiple services may be associated with the same claim, for example, a claim might include 2 services: an office visit and an x-ray. We linked encounter data to information on participating physicians (based on NPI), including volume of TM services, geographic location, and specialty, from the Medicare Data on Provider Practice and Specialty.

For each service, we also know the enrollee's MA plan. We link the plan to the associated contract and insurer because our key outcome variable, MA quality, is available only at the contract level. At the top of the hierarchy of MA, entities are insurers such as UnitedHealthCare. Each insurer might have several contracts [eg, a Health Maintenance Organization (HMO) contract], and each contract might have several plans (eg, a special needs plan). We obtained contract-level data on the type (eg, HMO), enrollment, and quality from publicly-available CMS files and the percentages of disabled and dual enrollees from the Medicare Master Beneficiary Summary File.

To create our analytic sample, we included evaluation and management services, procedures, imaging, and nonlaboratory

tests (57% of MA services) provided by physicians (84%). At the contract-level, we excluded 353 of 721 contracts, with 15.5% of enrollment, because of a lack of 2016 star ratings (largely because those contracts had exited MA by 2016; 2016 ratings are based on 2014 performance, the year of our encounter data). An additional 19 contracts (3.7% of enrollment) were excluded due to a low number of services per enrollee. Our final sample was 334 contracts with 78% of MA enrollment across 119 insurers, incorporating 249 million services provided by 600,329 physicians. For additional details on data and sample construction, please see the Appendix (Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>).

Physician Service Concentration

We constructed 2 measures to capture the level of service concentration between an MA insurer and associated physicians (ie, the percentage of a physician's services provided to enrollees of a given insurer). First, we measured the "insurer share of MA services" as the percentage of each physician's MA services provided under contracts offered by a given MA insurer. Second, we measured "MA penetration" as the percentage of each physician's Medicare services provided through MA (vs. TM) as the insurer's influence over physicians depends not only on their dominance of the physician's MA services but also the volume of MA services relative to TM.

Both measures were calculated at the physician-level. We then created a contract-level average of each measure across all physicians associated with a given contract. For our main analysis, these contract-level measures were weighted by the number of services each physician delivered under that insurer to more accurately reflect the level of service concentration between the contract and associated physicians. For additional details on variable creation, please see the Appendix (Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>).

Contract-Level Outcomes

Our key outcome variable was 2016 contract-level overall quality star rating (combining the Part C and Part D measure scores). The 2016 star rating is based on the performance during the 2014 service year (aligning with our encounter data). Since 2008, CMS has scored MA contracts on a scale from 1 star (poor) to 5 stars (excellent) and posted ratings to assist consumers when choosing a plan. Star ratings have also been used as a basis for financially rewarding high-performing MA contracts since 2012.

Quality ratings are based on scores on 45 measures derived from a combination of survey and administrative data.¹⁰ In addition to an overall quality score, measures are categorized into 9 domains: preventive care, chronic care, member experience, complaints and improvement, customer service, and 4 drug domains. Physician-insurer concentration could potentially be related to both clinical care (eg, improving preventive care) as well as administrative processes (eg, improving customer service). Thus, in our analyses, we used the overall quality score, scores for each domain, and Part C and Part D summary scores as outcome variables.

Analyses

Our unit of analysis was the contract. We used ordinary least-squares models with state fixed effects to assess the relationship between contract quality and MA penetration and insurer share of MA services. Regressions were weighted by MA enrollment to give more weight to contracts with relatively high levels of MA business. In our primary specification, the outcome variable was the contract's total performance score and the key explanatory variables were insurer share of MA services and MA penetration. To assess the impact of insurer-physician concentration for vulnerable populations, we included interactions between the percentage of enrollees who were disabled and insurer share of MA services. In all analyses, we controlled for contract type (HMO vs. other).

We conducted a number of additional sensitivity checks, including controlling for insurer and market characteristics and employing alternative measures of vulnerable enrollees. We also estimated several variations of our regression specification, including unweighted, ordered logit, and with the interaction of MA penetration and insurer share as a measure of overall "insurer affiliation." Further, we used domain-level quality scores as outcome variables as well as the Medicare Part C quality score rather than the total score which incorporates Part D. For detail on sensitivity analyses, please see the Appendix (Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>).

We used Stata, version 13 and SAS, version 9.4 for analyses. As determined by the Common Rule, policy research at the US Department of Health and Human Services that use secondary, administrative, and deidentified data for program analysis does not require approval by an institutional review board or informed consent.¹¹

RESULTS

MA Contract Characteristics in 2014

Table 1 shows summary statistics for the contract-level variables in our analysis. The average overall star rating was 4.0. The average insurer share of MA services was 48% and average MA penetration was 47%. The average enrollee's contract had just over 20% of enrollees originally eligible for Medicare due to disability. (Some contracts had up to 80% disabled enrollees, but the majority of MA enrollment was in contracts with under 30% disabled enrollees as shown in

Appendix Figure 1, Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>.) HMO contracts comprised over 60% of MA enrollment. Insurer share of MA services and MA penetration varied across contract types, with the highest levels of concentration in HMOs (Appendix Table 1, Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>).

Insurer-Physician Concentration and Quality

Figure 1 shows the unadjusted relationship between our concentration measures and MA quality ratings. Each observation represents a contract; contracts are color-coded and shape-coded to represent their star rating and each contract's location in the figure represents its insurer share of MA services and MA penetration. Lower quality plans (<4 stars) are clustered in the lower-left corner of the figure, reflecting lower insurer share and MA penetration, on average. In contrast, contracts with 4.5 and 5 stars are more concentrated to the right and upper right of the figure, indicating higher concentration between insurers and physicians in these plans. Indeed, both MA penetration and insurer share of MA increased monotonically with a contract star rating (Appendix Table 2, Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>). Figure 1 also illustrates the positive correlation between MA penetration and insurer share, which is ~0.3.

Table 2 shows estimates from the formal test of the relationship between concentration and quality. In our basic specification [column (1)], insurer share of MA services and MA penetration were significantly and positively associated with a star rating, the percentage of enrollees who were disabled was negatively associated with contract quality, and whether or not the contract was an HMO contract was not significantly associated with star rating. Our estimates suggest that an increase in insurer share of MA of 1 SD (just over 22%) was associated with an increase in contract quality of 0.09 stars. An increase in MA penetration of 1 SD of (just over 19%) was associated with an increase in contract quality of 0.33 stars. Sensitivity checks of our main results are shown in Appendix Tables 3A–3C (Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>) and are generally consistent with our main results.

The interaction between insurer share and the percentage of beneficiaries who were disabled was significantly and positively

TABLE 1. Variable Descriptions and Summary Statistics

Variables	Description	Mean	SD	Minimum	Maximum
Overall quality star rating	Star rating reported in 2016, based on performance in 2014	4.0	0.6	2.5	5
Insurer share of MA services	Percentage of MA services delivered to enrollees in insurer's contracts	47.5	22.2	3.6	99.0
MA penetration	Percentage of all (MA and FFS) services delivered to MA enrollees*	46.7	19.5	12.9	97.1
Percentage of enrollees disabled	Percentage of enrollees whose original source of eligibility was a disability	21.4	12.0	2.0	93.0
HMO (%)	= 1 if contract type if HMO, 0 otherwise	65.3	47.6	0.0	100.0

N = 334 contracts (12.6 million enrollees). Summary statistics are weighted by enrollment. "Insurer" refers to MA parent organization.

*MA insurer share and penetration are calculated for each physician; the mean is calculated at the contract level, weighting by each physician's number of services delivered to enrollees in the insurer's contracts.

FFS indicates fee-for-service; HMO, Health Maintenance Organization; MA, Medicare Advantage.

Source: Authors' analysis of Medicare Advantage Encounter Data from the Centers for Medicare and Medicaid Services (CMS), CMS public use files on contract quality, Medicare enrollment file, and Medicare Data on Provider Practice and Specialty.

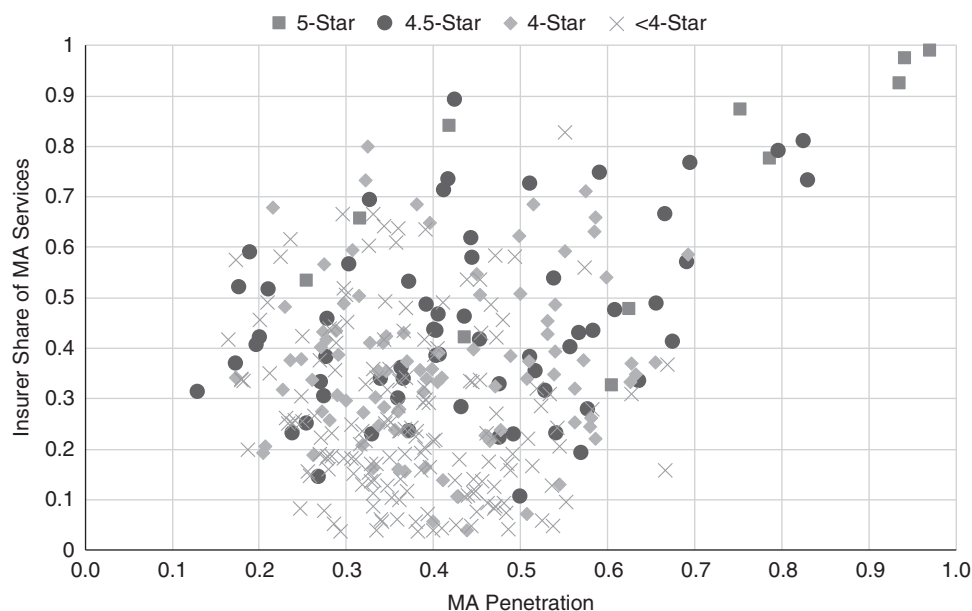


FIGURE 1. Quality Star Ratings as a Function of Medicare Advantage (MA) Insurer Share and Penetration, 2014. Each symbol denotes an MA contract (N=334 contracts, 12.6 million enrollees). *Source:* Authors' analysis of Medicare Advantage Encounter Data from the Centers for Medicare and Medicaid Services (CMS) and CMS public use files on contract quality.

related to quality [Table 2, column (2)]. Figure 2 illustrates this interaction between insurer share and disability by showing how quality varies by insurer share for contracts with a high (90th percentile) versus low (10th percentile) percentage of disabled enrollees. For both low-disability and high-disability contracts, higher insurer share of services was positively associated with quality, but the effect was larger in high-disability contracts. For low-disability contracts (dashed line), the difference in quality score between contracts with low versus high-insurer share was only 0.06 stars (4.22–4.28) compared with a difference of 0.44 stars (3.58–4.02) for high-disability contracts.

Said another way, the quality differential between low-disability and high-disability contracts was smaller among plans with more concentrated insurer-physician relationships than among those where physicians' services are spread across many insurers (represented vertically in Fig. 2). An increase in insurer share of 1 SD was associated with an increase of 0.06 stars for contracts that covered enrollees at the 10th percentile in terms of the percentage who were disabled. In contrast, for contracts that covered enrollees at the 90th percentile in terms of the percentage who were disabled, a 1 SD increase in insurer share was associated with an increase of 0.21 stars, a larger effect than the maximum adjustment (0.131) that CMS makes in terms of payment for contracts with vulnerable enrollees.¹²

In our domain-level analysis, we found that the relationship between MA penetration and quality score was mixed across domains; it was positive for "Managing Chronic Conditions" and "Member Experience," but negative for "Customer Service," and insignificant for the other 2 Part C domains (Appendix Table 4, Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>). The relationship was mixed for the

TABLE 2. Association Between Contract-level MA Penetration and Insurer Share of MA and Contract Quality, 2014

Contract-level Variable	Regression-adjusted Association With Contract Quality	
	(1)	(2)
	Overall	By Percentage of Disabled Enrollees
MA penetration	1.57 (0.19)*	1.53 (0.32)*
Insurer share of MA services	0.36 (0.14)**	−0.18 (0.28)
MA penetration×percentage of enrollees disabled		1.61 (1.47)
Insurer share of MA×percentage of enrollees disabled		2.65 (1.12)**
Percentage of enrollees disabled	−1.70 (0.19)*	−3.18 (0.71)*
HMO	−0.05 (0.05)	−0.09 (0.05)***
Constant	3.50 (0.08)*	3.72 (0.14)*
N	334	334
R ²	0.736	0.742

Contract-level regression. Dependent variable: contract-level star rating. SEs are represented in parentheses. State fixed effects not shown.

The term "Medicare Advantage" is sometimes used broadly to include other types of private plans, most of whose enrollment in is 1876 cost contracts. Cost contracts (eg, Kaiser Permanente Mid-Atlantic States) are required to submit encounter records and compete for beneficiaries based, in part, on published quality star ratings, but their payment is unaffected by their quality rating. We report regression results including these cost contracts, but the results are insensitive to their inclusion.

HMO indicates Health Maintenance Organization; MA, Medicare Advantage.

*Significant at the 0.01 level.

**Significant at the 0.05 level.

***Significant at the 0.1 level.

Source: Authors' analysis of Medicare Advantage Encounter Data from the Centers for Medicare and Medicaid Services (CMS), CMS public use files on contract quality, Medicare enrollment file, and Medicare Data on Provider Practice and Specialty.

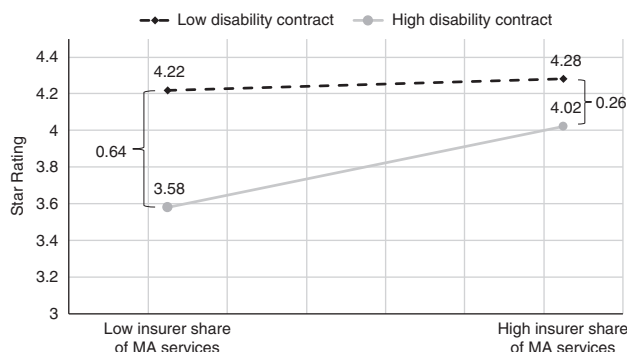


FIGURE 2. Impact of Medicare Advantage (MA) Insurer Share in High versus Low-Disability MA Contracts, 2014. Calculated based on regression results in Table 2. Low-disability contracts defined as those with disabled enrollment at the 10th percentile; high-disability contracts defined as those with disabled enrollment at the 90th percentile. Contracts with a low-insurer share of MA services defined as those with insurer share at the 10th percentile; contracts with a high-insurer share of MA services defined as those with insurer share at the 90th percentile. *Source:* Authors' analysis of Medicare Advantage Encounter Data from the Centers for Medicare and Medicaid Services (CMS), CMS public use files on contract quality, and Medicare enrollment file.

Part D domains. The direct relationship between insurer share of MA and quality was also mixed or insignificant across domains. As in the analysis of overall quality, there was a significant and positive association between the interaction of insurer share of MA and the percentage of enrollees who are disabled and quality in the nondrug clinical domains, "Staying Healthy," and "Managing Chronic conditions" domains. Effects of this interaction were statistically insignificant in the non-clinical domains of the Part C score and all Part D domains.

CONCLUSIONS

This study has 4 key findings. First, in 2014, physicians participating in MA provided, on average, close to half of their Medicare services in MA versus TM. Second, participating physicians had, on average, close to half of their MA services with 1 insurer. Third, we found that MA contracts characterized by more concentrated physician services had higher star ratings. We found that an increase in MA penetration of 1 SD was associated with a greater increase in contract quality than a 1 SD increase in insurer share of MA services (0.33 vs. 0.09 stars). This result suggests that physicians with relatively greater participation in MA overall focus more on quality, perhaps due to the role of quality incentives in the MA program more broadly. There is an additional effect of physician engagement with a specific insurer (captured through the insurer share measure), however, it is relatively smaller than the effect of overall MA participation. Finally, we found that the impact of insurer-physician concentration on star ratings was especially pronounced in contracts with a high proportion of disabled enrollees.

Improved quality in contracts characterized by more concentrated physician services could be due to a number of

factors. These relationships may facilitate improved care coordination for patients (eg, reducing duplicative testing), alignment of insurer and physician incentives to promote quality improvement and cost savings, as well as streamlined administrative functions. Our results support the idea that MA penetration and insurer share may be associated with improvements in both clinical and nonclinical domains. For example, we found that insurer share was associated with better performance on cancer screenings and diabetes care among contracts with a greater percentage of disabled enrollees. MA penetration was positively associated with performance on clinical chronic care measures and drug safety as well as member experiences. Future work providing more insight into the mechanisms driving the relationship between physician-insurer concentration and quality will be important.

From the physician's perspective, a greater concentration of services may be accompanied by increased investment in technology and other tools for patient and cost-management. Further, physicians may be more likely to respond to insurer incentives and goals if the majority of their business is with that insurer than if they work with multiple insurers. From the insurer's perspective, greater concentration with affiliated physicians may give the insurer more control over services and costs. More concentration would also allow insurers to accrue the full benefits of any cost savings or quality improvements that occur due to changes in practice. Thus, insurers may be more likely to invest in quality improvement processes and programs and any such initiatives may be more effective.⁹

The closer insurer-physician relationship that may result from more concentrated services may also enable other innovations, such as improvements in health information technology, patient and practice management, more efficient referral practices, and other structural changes (eg, integration between inpatient and postacute care) which may result in quality improvement. Physician payment may also vary between contracts with greater service concentration. Although CMS makes fee-for-service payments directly to physicians in TM, MA insurers have control over contracting with affiliated physicians. Evidence suggests that there is considerable variation in these arrangements, including subcapitation and the use of value-based payment models, and these models may be more widespread in settings characterized by more concentrated insurer-physician relationships.¹³ In turn, this type of payment may be associated with improvements on star ratings. Unfortunately, we lack systematic data on contracting and management innovations and whether they are more common in settings with closer insurer-physician relationships.

Limited evidence exists on how MA insurers are achieving quality for Medicare beneficiaries. Our study is consistent with and builds on existing research. Our findings align with evidence that insurer-physician integration based on common ownership is associated with improved quality.^{7,8} Common ownership is a useful measure because it recognizes a formal relationship which gives the insurer direct control over affiliated physicians. Our study builds on this work by examining insurer-physician relationships defined by practice patterns rather than formal arrangements. This measure allows us to consider a continuum of insurer-physician

integration based on how much of a physician's services are provided to enrollees of a given insurer. A service-based measure is supported by evidence that physicians tailor their practice patterns towards the patients and incentives of the dominant insurer with which they contract.^{14,15}

Our study was subject to several limitations. First, because they are new and have not yet been used for research, there is a concern that encounter data may not be as complete as TM claims or may have other issues with validity. MedPAC has documented variation in the reporting of certain kinds of encounter data, but for 2014, the year which served as the basis of our study, MedPAC found that 97% of contracts reported data on physician services to CMS. To judge the quality of encounter data, MedPAC used Healthcare Effectiveness Data and Information (HEDIS) data as a benchmark against which to compare MA service counts. However, the 2 datasets define encounters differently (Appendix, Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>) and when we use fee-for-service claims per enrollee in TM as a benchmark, we find found similar rates of services per enrollee in MA encounter records (Appendix Table 5, Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>).

Second, we were limited to contracts with available star rating data. The majority of the excluded enrollment due to missing rating data was in 2014 contracts that had exited MA before 2016 when the ratings were made public. If the excluded contracts were disproportionately low-quality, their omission could bias our results. Over 80% of this enrollment, however, was in the national insurers of UnitedHealthcare, Humana, and Aetna, none of whom lost market share in 2016. This suggests that the exclusion of contracts was due to within-insurer consolidation across contracts rather than the selective exit of contracts. In sensitivity analyses, we found that results are consistent when we include 100 of the missing contracts that were missing 2016 ratings, using their 2014 or 2015 star rating instead (Appendix Table 3C, Supplemental Digital Content 1, <http://links.lww.com/MLR/B852>).

Third, we observed only the Medicare portion of a physician's practice. If there are spillovers or other forms of interaction between Medicare and non-Medicare activities within a physician's practice, we may not have a complete understanding of the effects of insurer-physician relationships. Finally, we did not assess the cost implications of greater service concentration. Integration may enable reductions in duplicative testing, more efficient management, and lower administrative costs, allowing medical groups and insurers to lower costs (and potentially pass these lower costs on to customers). If improvements in quality depend on capital investments (eg, in information technology), however, or integration results in enhanced market power, this could result in higher costs to consumers.¹⁶ Indeed, previous evidence has shown that common plan-physician ownership was associated with higher premiums as well as higher quality.^{7,8}

Going forward, Medicare is increasingly incorporating new models of care that focus on coordinated care across the spectrum of care settings and payment for value rather than volume. With its innovations in delivery (ie, through private insurers receiving quality-based rewards) and payment (ie, capitation), MA offers a useful perspective on the potential effects of

such alternative models. Further validation of the MA encounter data will be valuable as these data are increasingly used for research and policy. In this study, we found that greater concentration of physician services with an insurer was associated with increased quality. Further, our results suggest that this type of integration may be especially beneficial for vulnerable populations. A more in-depth understanding of relationships between insurers and physicians and how they can promote quality will be important in MA as well as in other settings.

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